5-2020

# Participation in Mindfulness-Based Stress Reduction Therapy on the Immune Function of Survivors of Breast Cancer: A Literature Review and Pilot Study for Clinical Practice

Bianca Marteja
*Dominican University of California*

# Participation in Mindfulness-Based Stress Reduction Therapy on the Immune Function of Survivors of Breast Cancer: A Literature Review and Pilot Study for Clinical Practice

Bianca Marteja

Spring 2020

NURS 4998

Dominican University of California

Dr. Patricia Harris

In Fulfillment of an Honors Thesis

Acknowledgements

To my mother and father: without your support and patience, I would not be the person I am today. To my brother: thank you for always being my coffee shop companion.

Table of Contents

**Abstract**

A cancer diagnosis is one that invokes potential psychosocial distress among those newly diagnosed as well as those undergoing treatment. Individuals experiencing psychosocial distress associated with this condition may also present with a weakened immune system resulting from the effects that inflammatory mediators and stress have on immune function (Witek-Janusek, et. al., 2008). Mindfulness-based stress reduction therapy (MBSR) is a meditation-based program developed by John Kabat-Zinn in 1979. Evidence exists supporting the efficacy of this program in promoting stress reduction and improved psycho-social well being. As immune function is uniquely affected by the physiological effects that stress has on the body, this researcher examined existing literature that explored the potential effects of MBSR on immunity. Overall, a review of current literature presented in this work suggests that MBSR participation results in NKCA, T-cell and B-cell restoration as well as a reduction in inflammatory biomarkers. While results from these studies are statistically significant, they are, however, relatively small. Furthermore, the reliability and one's ability to generalize study findings from this literature review is limited by consistently small sample sizes, high attrition, differing forms of MBSR application, and inconsistent adherence to MBSR home practices.

The distribution of a 10-point survey using likert scales occured in a pilot study associated with the aforementioned literature review; this survey evaluated registered nurses' agreement with statements pertaining to openness to learning about MBSR, use of mindfulness practices in the clinical setting, and attitudes about the efficacy of mindfulness. Overall, registered nurses currently working in the clinical setting expressed agreement with the efficacy of mindfulness practices to promote physical and psychosocial wellbeing. However, disparities

were uncovered in the ability of participants to instruct patients about mindfulness practices, the frequency in which mindfulness practices were employed, as well as in the familiarity of participants with MBSR.

## Introduction

Changes to a cell's DNA, or genetic information, may arise spontaneously, resulting in what is known as a mutation. When mutations occur to a cell's DNA, elements of the cell's growth and metabolism can become altered, causing subsequent changes to the rate at which that cell undergoes cellular division. Cancerous cells exhibit genetic mutations that cause uncontrolled cellular proliferation, essentially causing the cell to grow, multiply, and, potentially, invade nearby tissues or organs.

For patients undergoing treatment for cancer, a plan of care that utilizes chemotherapy, radiation, surgical intervention, or a combination of all three, may be considered. While these treatments are focused on targeting cancer cells and affected tissues, leukopenia, or a state in which a patient exhibits a low level of white blood cells, occurs as a result of cancer treatments, such as chemotherapy or radiation. The Mayo Clinic identifies these therapies as having a toxic effect on bone marrow (The Mayo Clinic, 2019), one of the primary producers of red and white blood cells. White blood cells, in particular, are tasked with preventing bacteria, or other disease-causing agents, from causing infections. Thus, a problem arises in the resultant diminishing of a patient's immune function. Indeed, the American Society of Clinical Oncology sites neutropenia as placing patients at high risk for developing infection.

While the Mayo Clinic indicates that blood transfusion and medications, such as colony-stimulating factors (CSFs), are effective in promoting white blood cell production, a

holistic model of care would promote the use of complementary services in order to further facilitate recovery and wellness. Changes in diet, hygiene, and environmental sanitation are encouraged when a patient is neutropenic or is undergoing cancer treatment.

Mindfulness-based stress reduction therapy (MBSR), developed by John Kabat-Zinn, Professor emeritus at the University of Massachusetts Medical School as well as the founder of the university's Stress Reduction Clinic, is an 8-week cognitive therapy program targeting participants' ability to modulate stress and promote self regulation through the use of mindful meditation practices. This therapy was initially utilized for the treatment of chronic pain and has evolved to treat those with chronic anxiety, stress, and other psychological illnesses. As literature exists that suggests that MBSR has a positive effect on the immune functions of patients with cancer, this researcher seeks to determine the veracity of such an assertion.

## Literature Review

The research question being investigated during this review of literature was: what evidence exists that supports the claim that participation in MBSR results in positive immunological outcomes? What specific elements of immunity does participation in MBSR affect? A review of current literature on this topic was conducted, utilizing databases such as PubMed, ScienceDirect, and Sage Journals to find pertinent works. Research articles that investigated the physiological effects of participation in MBSR on patient immune function were collected and evaluated. Current literature will be presented under the subheadings of lymphocytes, inflammation, and telomerase activity as these biomarkers were involved in the majority of findings related to MBSR and immune regulation.

### MBSR and Lymphocytes

A majority of the current literature included in this review reported that MBSR participation resulted in statistically significant improvements in peripheral blood lymphocytes, mainly Natural Killer Cell Activity (NKCA) and T-Cell Activation (Witek-Janusek, et al, 2008; Lengacher, et al., 2013; Fang, et al, 2010; Sarenmalm, et al., 2013; Reich, et al., 2014).

Witek-Janusek et al. (2008) has accumulated a large body of research on the topic of MBSR and its effects on quality of life, fatigue, and immunological function. In 2008, Witek-Janusek et al. conducted a non-randomized controlled study involving 66 women 35-75 years of age who were diagnosed with early stage breast cancer and who had not undergone chemotherapy but had undergone surgery that may or may not have been followed by radiation therapy. Participants in this study self-selected into an MBSR group or a control group, receiving only usual care (UC). Assessment of immune function occurred using blood samples obtained

from participants, these assessments were conducted at four points during this study: pre-intervention (T1), 4 weeks after MBSR intervention (T2), after completion of MBSR (T3) and 1 month after completion (T4). In terms of findings related to immune function, this study presents data suggesting that participation in an 8-week MBSR program resulted in improvements in NKCA as well as a notable decrease in plasma cortisol and cytokine levels. This study also noted a significant interaction between treatment result and time, indicating that observed improvements in immune function may be related to a recovering immune system as opposed to the complementary effects of MBSR on immune function. Further limitations of this study include non-randomization, which may account for an imbalance between control and intervention groups with regards to demographic data as well as treatment received for cancer. Participants in this study self-selected into groups, it is possible that those who self-selected into the MBSR group had preconceived expectations of MBSR as well.

Witek-Janusek et al. (2008) has also conducted a more recent study in 2019 utilizing a longitudinal randomized trial design with active control to investigate the effects of MBSR on the psychological, behavioral, and immunological function of 192 women with early stage breast cancer. Women were randomized into the MBSR intervention group, in which they participated in the 8-week program led by an instructor trained in MBSR, or the active control group (ACC), in which participants were instructed about facets of recovery and health promotion. Evaluations of immune status and psychological outcomes occurred five times; before intervention (T1), after 4 weeks into the MBSR program (T2), after completion of the program (T3), one month after completion (T4), and six months after completion (T5). Both meetings for the MBSR and ACC groups were held at the same location. Immunological measures assessed in this study included

an analysis of NKCA and cytokine production. Findings of this study suggest that a significant relationship exists between the ability of MBSR to promote reductions in sleep disturbances and fatigue, thereby promoting a restoration of NKCA. No statistically significant findings were reported regarding effects of MBSR on plasma cytokine concentrations. Participation in MBSR includes a prescribed time for at home practice; participants in this study did not maintain a consistent log of their practice times, indicating a potential limitation of the study results as findings in the MBSR group may or may not have been affected by differences in individual at home practices. The demographic of women involved in this study were mainly white, middle-class, and married, limiting the ability to generalize the results of this study to non-white individuals of differing socio-economic status.

Lengacher et al. (2013) utilized a two-armed randomized control design in to investigate if participation in MBSR would promote immune recovery in women following treatment for breast cancer. Participants included women twenty-one years and older diagnosed with Stage 0,I, II, or III breast cancer who had already completed treatment. This study utilized an adaptation of the MBSR program, MBSR(BC), developed specifically to be applied for patients with breast cancer, as the intervention. The MBSR(BC) intervention spans the total of six weeks and involves a combined group and at home practice format similar to MBSR. A total of eighty-four women were recruited, these participants were randomized to either the MBSR(BC) intervention group or the control group that experienced the usual course of care after cancer treatment (UC). Assessments involving the collection of blood samples were collected before the start of the MBSR(BC) intervention and within two weeks post-intervention.

Results of this study indicate that the timeframe before end of cancer treatment and start of MBSR treatment is of particular importance. This study found that among patients with breast cancer that completed their cancer treatment within a twelve week time period, statistically significant improvements in T cell activation were observed. This work sheds light on the fact that the restoration of biomarkers such as NK Cells, T Cells, and B Cells observed in this study may be attributed to the restoration of the client immune system overall, as a mechanism of normal healing as opposed to a direct result of MBSR(BC) intervention. Limitations of this study include a lack of long-term follow up and a failure to exclude participants with prior exposure to MBSR or MBSR(BC) in exclusion criteria. This work also indicated that the clinical implication of their study findings should be further explored in a future long-term and longitudinal randomized study.

Sarenmalm et al. (2013) conducted a longitudinal three armed randomized study with the objective of evaluating the effectiveness of MBSR on participants' psychological distress, coping, and immune function. A sample size of one-hundred and sixty six women were randomized into an MBSR group, an active control group, in which individuals self-taught mindfulness practices and a non-MBSR group. Assessments included questionnaires testing for psychological effects of MBSR and peripheral blood samples to evaluate immune function. Data collection occurred before the start of the MBSR intervention, three, six, and twelve months after initiation of the program. After the twelve month period, data was collected yearly, with the last data collection occurring five years after completion of MBSR.

Biomarkers for immune function investigated in this study were NKCA, T-Cell and cytokine concentrations, specifically of IL-6 and IL-8. Sarenmalm et al (2013) suggests that

improvements in NKCA and T-Cell concentration observed in this study were related to improvements in perceptions of individual growth and an improvement in perceptions of meaning established through participation in MBSR. This study exhibited various strengths, including its three-armed control design and its longitudinal scope. Limitations reported by the study include discrepancies in randomization of cancer staging among the groups as well as the failure of the study to exclude women with mood disorders from participation. This study also suggested that future longitudinal studies are necessary to determine if positive outcomes observed persist over time.

**MBSR and Inflammation**

Previous research also suggests that participation in MBSR may have significant effects on inflammatory mediators such as cytokine and cortisol concentrations. Lengacher et al. (2012) presents a study using a quasi-experimental pretest and posttest design to explore the effects of MBSR-C, an adaptation of MBSR for patients with cancer, on the psychological and physical symptoms, quality of life, cortisol and IL-6 concentrations of advanced stage cancer patients and their caregivers. The study utilized a sample of 26 women and men with stage III or IV breast, colon, lung, or prostate cancer who completed surgery or undergoing RT and/or CT. Assessment of physiological measures and salivary cortisol and IL-6 occurred before and after attendance of a MBSR-C class at weeks one, three, and six. Participants were instructed on how to self teach during at-home practice on weeks two, four, and five.

This study reports a significant change in salivary cortisol of participants was observed at week one and three but not at week six. It is suggested that a significant decrease at week six was not found due to cortisol levels being already reduced by the time assessments were to be

conducted at week six. A lower IL-6 concentration overall was noted in patients by week six, this result was lower than baseline. The small sample, lack of control, and varied adherence to the prescribed practice times, however, makes these findings inconclusive as it cannot be determined if changed in these inflammatory markers are attributed to the MBSR-C intervention or outside influence.

Carlson et al. (2013) utilized a longitudinal randomized control trial using an initial sample of 271 women with stage I, II, and III breast cancer who were experiencing severe psychological distress related to their condition. The main objective of this study was to compare the effectiveness of MBCR, an adaptation of MBSR, and supportive-expressive group therapy (SET) on salivary cortisol, mood disturbances, stress, and quality of life among their sample population. Results of this study report that the slope in change of salivary cortisol during the intervention was significantly more negative in the SET and MBCR groups compared to a non-intervention control. Carlson et al reports that both participation in MBCR and SET demonstrated decreases in salivary cortisol. Findings favored MBCR over SET. Despite these findings, Carlson and colleagues report that the changes in cortisol observed were small to medium in size. Limitations of this study are attributed to a high rate of attrition among participants, a lack of long term follow up, and a lack of a specific manner of rating patient treatment fidelity in terms of adherence to home-practice recommendations.

Bower et al. (2015) conducted a two-armed randomized controlled trial evaluating the feasibility and efficacy of a mindfulness intervention for women diagnosed with breast cancer at or before fifty years of age. The sample used in this study included seventy-one women with stage 0, I, II, or III breast cancer who completed therapy at least three months before the start of

the intervention. The intervention utilized in this study was not MBSR but instead was based on a mindful awareness practices (MAP) program developed in UCLA. This intervention lasted 6 weeks and involved 2 hour weekly group sessions, home practice, and daily reporting on mindfulness practice. Inflammatory outcomes measured in this study include: expression of nineteen proinflammatory gene transcripts that increase during chronic stress, NF-κB (a measure of the activity of proinflammatory transcription factor), and IL-6, CRP, and Tumor Necrosis Factor (TNF). After the MAP intervention, this study reports a decrease in NF-κB but no significant findings for CRP, IL-6, or STNF. Bower et al. reports that the alterations in NF-κB observed in these premenopausal breast cancer survivors indicates that mindfulness provides a short-term health benefit for women with breast cancer. Limitations of this study were small sample size, no control for non-specific effects of the intervention, as well as the failure of the study to include prior experience with MBSR or MAP in exclusion criteria.

**MBSR and Telomerase Activity**

Lastly, one study obtained during the review of literature investigated the effects of MBSR on telomerase length (TL) and telomerase activity (TA), biomarkers linked with immune competence. Lengacher et al. conducted a study in 2014 exploring the effects of MBSR(BC) on TL and TA, hypothesizing that MBSR would demonstrate more positive changes in TL and TA as opposed to usual care (UC). This study utilized a randomized, wait-listed controlled design on a sample of 134 women diagnosed with Stage 0-III Breast Cancer who had undergone a lumpectomy or mastectomy and who had completed RT and/or CT. Data in the form of peripheral blood samples were collected at baseline, six weeks, and twelve weeks. Results suggest that after twelve weeks, telomerase activity in women assigned to the MBSR group

increased steadily over time, a significant finding despite efforts to control for baseline TA among these individuals. There was no indication that MBSR had a significant effect on TL of the participants. This study cited other work to corroborate that the findings reported were consistent with existing literature. Limitations of this work included the fact that the study did not control for the effects of group dynamics on study outcomes and that no long-term evaluations were conducted on the persistence of TA improvement after the 12 week assessment. Indeed, this study indicates that the net clinical benefits are unclear as the long-term effects of MBSR on TA were not evaluated.

In summary, the studies included in this literature review indicate that the practice of MBSR may have a positive effect on the concentration of immunological biomarkers present among participants. Positive results of MBSR on immune function were demonstrated in the NKCA restoration (Witek-Janusek, et al, 2008;Witek-Janusek, et al, 2019; Fang, et al, 2010; Sarenmalm, et al., 2013), T-Cell and B-Cell restoration (Lengacher, et al., 2013; Sarenmalm, et al., 2013; Reich, et al., 2014), decreases in inflammatory markers (Lengacher, et al., 2012; Carlson, et al., 2013; Bower, et al., 2014), and improvement in telomerase activity (Lengacher, et al., 2014). It should be noted, however, that, while such findings were significant statistically, the net effect of MBSR on immune function was small. Furthermore, the studies presented in this literature review do not determine if such findings were a direct result of MBSR involvement or were a result of the various psychosocial benefits, including stress reduction and improved self perception, that are a subsequent result of MBSR participation. Thus, while more evidence must be presented to support the use of MBSR as an effective method of promoting immune function,

evidence exists that supports the promotion of MBSR as an effective psycho-social therapy to be offered in practice.

## Proposal For Further Study

While conducting this literature review, an evident gap was uncovered in the body of research focusing primarily on the use of MBSR in the clinical setting and on the long-term outcomes of such participation. In an effort to contribute to the body of literature surrounding MBSR and its potential implementation in the clinical setting, this researcher sought to investigate current attitudes and present knowledge regarding mindfulness practices and MBSR. In particular, this researcher sought to determine if mindfulness practices were readily employed within hospitals by registered nurses as interventions, how strongly registered nurses believe mindfulness practices are effective for promoting physical and psychosocial health, as well as how familiar current registered nurses are with MBSR specifically. Through a survey of current attitudes about mindfulness and MBSR, the information uncovered by such a study could inform how these practices could potentially be implemented in the future.

## Theoretical Framework

Neuman's Systems Model, developed by nurse and researcher Dr. Betty Neuman, provides a unique perspective on the patient experience. This nursing theory purports that a patient's ability to regulate their health is dependent on interactions between specific "circles" of their health and external stressors (Newman and Fawcett, 2011). According to this theory, a patient is represented as an "open client system;" maintaining a balanced client system is equivalent to the client achieving an optimal level of health.The primary threat to maintaining a balanced system is identified by Neuman as being environmental stressors. This model asserts

that physiological, psychological, sociocultiral, developmental, and spiritual variables are key factors that determine the extent to which external stressors may place the client system in dysregulation (Newman and Fawcett, 2011).

The circles discussed in this nursing model are concentric, meaning that the largest circle encompasses smaller circles within it, the smallest being the core of the client system. The core includes features specific to the client's psycho-social and health history as well as components of the client's health that are normal characteristics of the species as a whole, including normal human regulatory patterns and standard physiological responses to stress. Circles outside of the core that serve to protect it include the "basic line of defense" as well as the "flexible line of defense." The normal line of defense lies outside of the core and utilizes the client's past experiences and responses to stressors, as well as portions of the client's health, social, and demographic history, to inform how the client responds to current environmental stressors. The flexible line of defense is represented as the outermost circle in the client system, functioning as a dynamic buffer for the normal line of defense. Greater protection to the core of the system is afforded when the flexible line of defense is able to expand, creating further distance between external stressors and the core. Expansion of the flexible line of defense occurs as a result of improvements in psychosocial and biological factors such as sleep and nutrition (Jukes and Spencer 2007). Conversely, the flexible line of defense is negatively affected and will begin to retract, drawing closer to the core, if it encounters and begins to be impacted by multiple stressors. Dysregulation of the core, manifesting in dysregulation in a client's mental and physical health, occurs when external stressors surpass the flexible line of defense as well as the normal line of defense.

Mindfulness-based stress reduction therapy (MBSR) is a meditation-based program developed by Jon Kabat Zinn in 1979. The main target of this therapy is to decrease the levels of stress experienced by participants. Several studies have indicated that, after participation in MBSR, individuals reported improvements in quality of life, mental health, and overall psychological distress (Fang et al., Witek-Janusek et al.). When applied to the Neuman's Systems Model, this cognitive therapy would certainly reinforce a participant's flexible line of defense, as participation in MBSR has resulted in reported decreases in sleep disturbance and overall fatigue (Witek-Janusek et al. 2019). As evidence exists linking stress to immune dysfunction (Fang et al., 2010), participation in a therapy that specifically targets stress reduction would function as a means to promote the recovery of a patient's immunity, especially if the individual had undergone procedures that would negatively affect their immune function, such as those seen in patients with cancer.

The Neuman Systems Model places holistic and preventative care at the forefront of patient care management (Neuman and Fawcett, 2011). As this model emphasizes the importance of promoting wellness in an effort to decrease an individual's susceptibility to external stressors, encouraging MBSR as a complementary therapy would certainly fall within the context of providing holistic and prevention focused care. Thus, conducting research that assesses current attitudes clinical towards and implementations of mindfulness practices would certainly benefit the study of mindfulness practices and MBSR in the clinical setting.

**Primary Research Aims**

- What are registered nurses' attitudes about the effectiveness of mindfulness practices in promoting psychosocial and physical health?
- Are registered nurses familiar with MBSR or its availability in the out-patient setting?
- Are registered nurses open to receiving education about MBSR or implementing mindfulness practices in the future?

## Ethical Considerations

This study has been approved by the Internal Review Board at Dominican University of California and was conducted in April 2020. No vulnerable groups were targeted to participate in the study. No form of compensation for completing the study survey was offered, participants completed the survey voluntarily. Registered nurses currently working within hospitals were asked to volunteer participation in a short survey. The study survey was distributed electronically, advertised on the social media platform Facebook as well as emailed to members of the Rho Alpha chapter of Sigma Theta Tau, the International Nursing Honors Society. Participants' consent to utilize responses in the aforementioned study was implied upon completion of the survey. A statement indicating that consent is given upon survey completion was also included within the introduction page preceding the survey itself. No identifiable information was collected during the response collection process; the survey software that was used to distribute the electronic survey only collected the IP Address associated with the electronic device used to complete the survey as well as the longitude and latitude of the location in which the survey was completed. Data was stored on a password protected computer. The data

collected in this study was not shared with any other individuals other than the researcher and Dr. Patricia Harris, thesis advisor. All efforts to maintain participant anonymity was exercised.

## Research Method

This study utilized convenience sampling to obtain quantitative data surrounding registered nurses' agreement with statements pertaining to mindfulness practices in the clinical setting and MBSR. Inclusion criteria included all registered nurses currently working in the hospital setting; the expected sample size was 60 participants. Those excluded from completing the survey were individuals who were not registered nurses currently working.

Participants voluntarily completed a survey (Appendix A) examining their attitudes about mindfulness, how often they implement mindfulness practices in the clinical setting, their current knowledge about MBSR, their openness about learning more about MBSR, and their perceived efficacy of the practice itself. If participants chose to access the electronic link through Facebook, or through their electronic mail, they first clicked on the link itself. Participants then were redirected to the Qualtrics website, where the survey was hosted. A separate tab opened on their computer or telephone, or the browser the participant was using automatically redirected to the Qualtrics website. Once redirected to the electronic survey, participants first viewed an introduction page; background information about the researcher and the research topic was provided on this page. Furthermore, a statement indicating that a waiver of written consent was provided once participants have completed and submitted the survey was also included on this page. Once participants clicked on the red "next" button on the bottom right of the screen, they were directed to the survey itself. The survey is a 10-point questionnaire using likert scales to measure participant agreement with statements such as "I am familiar with the practices of

mindfulness and mediation" and "I am familiar with Mindfulness-based stress reduction therapy (MBSR)." Once all statements in the survey were answered with a numerical answer, indicating the level of participant agreement with the statement, participants then clicked on the "next" button at the bottom of the page. A new page populated that both thanked the participant for their response and indicated that their responses have been recorded. Once participants reached this page, they were free to exit out of the Qualtrics website as this page indicated that the survey had ended. Participant data was analyzed using descriptive statistical analysis to determine if any trends in nurses' perceptions about mindfulness and MBSR were present.

## Results

A total of 69 responses were collected by the survey software. Out of the sixty-nine responses, sixty-two responses were completed and provided the necessary data for analysis. Seven responses that were submitted for collection did not provide any data and thus were not included in the final data analysis. The lack of data in these seven responses may be attributed to the participants opening the electronic survey and submitting without providing their answers to the likert scale questions. SPSS software was utilized in analyzing the data collected.

Participants were asked to rate their agreement with each of the ten statements provided in the survey on a scale from 0-7. A rating of zero indicated that the participant neither agreed nor disagreed with the given statement. A rating of one indicated strong disagreement and a rating of seven indicated strong agreement. Table 1 included below details how the numerical ratings were interpreted in this study.

**Table 1**

| Rating (0-7) | Interpretation |
|---|---|
| **0** | Neither agree nor disagree |
| **1** | Strong Disagreement |
| **2** | Moderate Disagreement |
| **3** | Slight Disagreement |
| **4** | Leaning Towards Agreement |
| **5** | Slight Agreement |
| **6** | Moderate Agreement |
| **7** | Strong Agreement |

## Results

Statement one asked participants to rate their agreement with the statement: "I am familiar with the practice of mindfulness and meditation." The average rating for this statement was that of slight agreement, with the median response also falling on slight agreement. 26% of respondents strongly agreed with this statement while 4.3% strongly disagreed.

Statement two asked participants to rate their agreement with the statement: "I am knowledgeable of how to instruct patients in mindfulness practices." 14.5% of participants strongly agreed with this statement, 20.3% reported they were leaning towards agreement, while 7.2% indicated they strongly disagreed with the statement. The average response to this statement was that of a four, indicating leaning towards agreement.

Statement three asked participants to rate their agreement with the statement: "I regularly instruct my patients in practices involving mindfulness." The average response to this statement

was that of a 4, indicating leaning towards agreement. Overall, 13% of participants strongly agreed with this statement, 15.9% moderately agreed, and 7.2% strongly disagreed.

Statement four asked participants to rate their agreement with the statement: "I believe that mindfulness practices offer beneficial physiological benefits." 47.8% of participants indicated that they strongly agreed with this statement, 14.5% indicated that they moderately agreed with this statement, while 2.9% slightly disagreed. Overall, the average response to this statement was of moderate agreement (six).

Statement five asked participants to rate their agreement with the statement: "I believe that mindfulness practices offer beneficial psychological benefits." The average response to this statement was of moderate agreement. 50.7% of participants strongly agreed with this statement. 11.6% of respondents were leaning towards agreement while 1.4% indicated they moderately disagreed with the statement.

Statement six asked participants to rate their agreement with the statement: "I am familiar with Mindfulness-based stress reduction therapy (MBSR)." The average response to this statement was leaning towards agreement. 14.5% of registered nurses strongly agreed with this statement; 20.3% of participants were leaning towards agreement while 4.3% strongly disagreed.

Statement seven asked participants to rate their agreement with the statement: "I am open to learning about MBSR." 50.7% of respondents cited strong agreement with this statement. 15.9% slightly agreed, 1.4% slightly disagreed with this statement. Overall, the average response to this statement was that of moderate agreement (six).

Statement eight asked participants to rate their agreement with the statement: "I am open to suggesting MBSR as a complementary therapy to my patients to promote immune recovery."

The average response to this statement was that of moderate agreement (six). 36.2% of respondents cited strong agreement with this statement, 18.8% indicated slight agreement, while 4.3% responded with slight disagreement.

Statement nine asked participants to rate their agreement with the statement: "I am open to suggesting MBSR as a therapy to promote psychosocial health and wellbeing." 40.6% of participants reported strong agreement with this statement. 18.8% of registered nurses indicated moderate agreement, while 2.9% reported that they neither agree nor disagreed with the statement (zero). Overall, the average rating for this statement was that of moderate agreement (six).

Statement ten asked participants to rate their agreement with the statement: "I believe there should be increased availability of education regarding MBSR enrollment and referral." The average response to this statement was that of moderate agreement (six). 50.7% of participants reported that they strongly agreed with this statement; 13.0% moderately agreed and 10.1% were leaning towards agreement.

A T-test was conducted to determine if any significant differences occurred in the manner in which the two distribution groups, those recruited via Facebook and those via the Rho Alpha mailing list, rated their agreement with the statements provided in the survey. The only statistically significant difference occurred in the manner the two groups rated statement seven, "I am open to learning about MBSR." The P-value among the two groups in rating this statement was that of .001. Those among the Rho Alpha mailing list rated this statement higher than those recruited via Facebook. Those recruited from Rho Alpha demonstrated an average rating of 6.8

(moderate agreement) while those recruited via Facebook demonstrated an average response of 5.98 (slight agreement).

## Discussion

This study uncovered disparities in nurses' confidence of their own ability to instruct patients in mindfulness practices as well as the frequency in which they do so. The nurses who participated in this study also demonstrated varied levels of agreement regarding
Their familiarity with mindfulness and meditation overall. Furthermore, disparities also were found in the level of awareness nurses previously had regarding MBSR.

Results from this study largely demonstrate that the sample of registered nurses that were surveyed expressed a general openness to learning about mindfulness-based stress reduction therapy as well as a general openness regarding suggesting its use for both physical and psychosocial benefits in the future. Furthermore, a majority of registered nurses recognized that mindfulness practices had beneficial physiological and psychological practices, however, it should be emphasized that the robustness of this held belief among nurses varied, as reflected in the varying levels of agreement (between strong, moderate, and slight) uncovered in this study.

The statistically significant difference in the manner in which the group recruited via Facebook versus the group recruited via the Rho Alpha mailing list rated statement seven ("I am open to learning about MBSR") may be attributed to those in the Facebook group already having previous experience and exposure with MBSR. Additionally, this difference may also be attributed to a general heightened interest in learning about this therapy expressed among the Rho Alpha group. However, the significance of this finding is questionable as there was not an

equal distribution of participants between the two groups; thirteen participants were recruited via Rho Alpha and forty-seven participants were recruited via Facebook.

Limitation of this study included its small sample size and the inability to ensure that only registered nurses were able to complete the electronic survey (as the survey technically was made accessible to any individual clicking the link).

## Conclusion

Using a holistic and interdisciplinary approach to nursing ensures that patient wellness is effectively promoted and maintained. As research shows that MBSR significantly reduces the amount of fatigue, psychological distress, sleep disturbance, and stress experienced by participants, offering enrollment into a MBSR program for patients who may or may not exhibit signs of distress related to their condition may be beneficial regardless of potential immune benefits. Future longitudinal, controlled studies need to be conducted in order to determine the feasibility of offering MBSR specifically as a complementary treatment targeting improvements in immune function. Longitudinal studies should also explore the incidence of infection among those practicing MBSR practices in order to determine if physiological effects of this therapy result in decreased disease incidence as a sign of strengthened immunoregulation.

With the intent of determining present clinical attitudes about mindfulness and MBSR in particular, this study uncovered a general openness towards learning more about these practices as well as identified areas where improvement in education may be necessary, such as in educating nurses about how to conduct patient teaching about mindfulness practices in order to better implement these holistically focused practices in their daily patient care. In future studies, qualitative data should be collected about the specific attitudes and concerns registered nurses

have regarding mindfulness and MBSR in order to determine potential barriers to its implementation in the clinical setting. Furthermore, studies should examine the current availability of MBSR in the clinical and out-patient setting as well as the current frequency in which mindfulness practices are taught in the in-patient setting. Overall, this study contributes to the greater discussion of how healthcare providers can best promote a holistic form of care and to promote wellness in the future given that health and wellness are best fostered through caring for both the body and mind.

# References

Bower, J. E., Crosswell, A. D., Stanton, A. L., Crespi, C. M., Winston, D., Arevalo, J., … Ganz, P. A. (2015). Mindfulness meditation for younger breast cancer survivors: a randomized controlled trial. *Cancer*, *121*(8), 1231–1240. doi:10.1002/cncr.29194

Fang, C. Y., Reibel, D. K., Longacre, M. L., Rosenzweig, S., Campbell, D. E., & Douglas, S. D. (2010). Enhanced psychosocial well-being following participation in a mindfulness-based stress reduction program is associated with increased natural killer cell activity. *Journal of alternative and complementary medicine (New York, N.Y.)*, *16*(5), 531–538. doi:10.1089/acm.2009.0018

Infection. (August, 2018). Retrieved December 02, 2019, from https://www.cancer.net/coping-with-cancer/physical-emotional-and-social-effects-cancer/managing-physical-side-effects/infection

Janusek, L.W, Albuquerque, K., Chroniak, K. R., Chroniak, C., Durazo-Arvizu, R., & Mathews, H. L. (2008). Effect of mindfulness based stress reduction on immune function, quality of life and coping in women newly diagnosed with early stage breast cancer. *Brain, behavior, and immunity*, *22*(6), 969–981. doi:10.1016/j.bbi.2008.01.012

Janusek, L.W., Tell, D., & Mathews, H.L. (2019). Mindfulness based stress reduction provides psychological benefit and restores immune function of women newly diagnosed with breast cancer: A randomized trial with active control. *Brain, Behavior, and Immunity, 80*, 358-373.

Jukes, M., Spencer, P. (2007) Models for Practice: Neuman's Systems Model (First Edition). *Person-Centered Practices: A Holistic and Integrated Approach* (pp. 32-33). London: Quay Books.

Kenne Sarenmalm, E., Mårtensson, L.B., Holmberg, S.B. *et al.* Mindfulness based stress reduction study design of a longitudinal randomized controlled complementary intervention in women with breast cancer. *BMC Complement Altern Med* 13, 248 (2013) doi:10.1186/1472-6882-13-248

Kenne Sarenmalm, E., Mårtensson, L. B., Andersson, B. A., Karlsson, P., & Bergh, I. (2017). Mindfulness and its efficacy for psychological and biological responses in women with breast cancer. *Cancer medicine*, *6*(5), 1108–1122. doi:10.1002/cam4.1052

Lengacher, C.A., Kip, K., Barta, M., Post-White, J., Jacobsen, P.B., Groer, M.E., Lehman, B., Moscoso, M.S., Kadel, R., Le, N., Loftus, L.S., Stevens, C.A., Malafa, M.P., & Shelton, M.M. (2012). A pilot study evaluating the effect of mindfulness-based stress reduction on psychological status, physical status, salivary cortisol, and interleukin-6 among advanced-stage cancer patients and their caregivers. *Journal of holistic nursing : official journal of the American Holistic Nurses' Association, 30 3*, 170-85 .

Lengacher, C. A., Reich, R. R., Kip, K. E., Barta, M., Ramesar, S., Paterson, C. L., … Park, J. Y. (2014). Influence of mindfulness-based stress reduction (MBSR) on telomerase activity in women with breast cancer (BC). *Biological research for nursing*, *16*(4), 438–447. doi:10.1177/1099800413519495

Low blood cell counts: Side effects of cancer treatment. (February, 2019) Retrieved December 02, 2019, from www.mayoclinic.org

Neuman, B., Fawcett, J. (2011) *The Neuman Systems Model (*Fifth Edition, pp. 12-20). Saddle River, NJ: Pearson Education, Inc.

Reich, R. R., Lengacher, C. A., Kip, K. E., Shivers, S. C., Schell, M. J., Shelton, M. M., … Klein, T. W. (2014). Baseline immune biomarkers as predictors of MBSR(BC) treatment success in off-treatment breast cancer patients. *Biological research for nursing*, *16*(4), 429–437. doi:10.1177/1099800413519494

Rouleau, C. R., Garland, S. N., & Carlson, L. E. (2015). The impact of mindfulness-based interventions on symptom burden, positive psychological outcomes, and biomarkers in cancer patients. *Cancer management and research*, *7*, 121–131. doi:10.2147/CMAR.S64165

Santorelli, S. (2014). *Mindfulness-based Stress Reduction (MBSR): Standards of Practice.* Shrewsbury, Massachusetts: Center for Mindfulness in Medicine, Health Care and Society.

Spellenberg, R. (1998). *National Audubon Society Field Guide to North American Wildflowers: Western Region*. New York, NY: Alfred A. Knopf.

## Appendix A - Study Survey

1. I am familiar with the practices of mindfulness and mediation _____
2. I am knowledgeable of how to instruct patients in mindfulness practices _____
3. I regularly instruct my patients in practices involving mindfulness _____
4. I believe that mindfulness practices offer beneficial physiological benefits _____
5. I believe that mindfulness practices offer beneficial psychological benefits _____
6. I am familiar with Mindfulness-based stress reduction therapy (MBSR) _____
7. I am open to learning about MBSR _____
8. I am open to suggesting MBSR as a complementary therapy to my patients to promote immune recovery _____
9. I am open to suggesting MBSR as a therapy to promote psychosocial health and wellbeing _____
10. I believe there should be increased availability of education regarding MBSR enrollment and referral _____

**Appendix B- Literature Review Table**

| Authors + Year | Theoretical Framework | Research Question | Study Design | Population & Sample Size | Instruments | Findings | Major Strengths & Weaknesses |
|---|---|---|---|---|---|---|---|
| Bower et al. (2015) | Mindfulness interventions will result in decreased inflammatory mediators as a result of reduced perceived stress. | What is the feasibility and efficacy of a mindfulness intervention for women diagnosed with breast cancer at or before 50 years of age | Two-armed randomized controlled trial | Women with stage 0. I, II, III cancer 50 years and older ano who have completed cancer treatment at least 3 months prior<br><br>Sample size of 71 women | PBMC transcriptional profiling<br><br>MAPs program at UCLA | Premenopausal breast cancer survivors who participated in a two-armed study exhibited decreased gene expression of genetic components involved in inflammation. | Small sample size, did not exclude prior exposure to MBSR, no control non-specific effects of intervention |
| Carlson et al. (2013) | Psychological distress results in alterations in cortisol, increased mood disturbance, and decreased quality of life. | What is the efficacy of MBCR and supportive expressive group therapy (SET) among distressed survivors of breast cancer? | Randomized controlled trial | Women with Stage I-III Breast Cancer<br><br>Sample size of 271 women | Diurnal cortisol slopes, Hochberg correction | Participation in MBCR and SET demonstrated decreases in salivary cortisol. Favored MBCR over SET. | High attrition, no long term follow up, no rating of treatment fidelity |
| Januse k et al. (2008) | Mindfulness will have positive effects on the immunosuppression that occurs as a result of the natural stress response | What is the effect of the MBSR on immune function, Quality of life, and coping among participants ? | Non-randomized control design | Women 35-75 with early stage breast cancer who did not undergo chemotherapy with or without radiation therapy<br><br>Sample: 66 Women | Quality of Life Cancer Version III, Mindful Attention Awareness Scale, PBMC, NKCA, Cortisol | Participation in an 8 week MBSR program resulted in decreased cortisol and cytokine levels. Improvements in NKCA also occurred. | Non-randomized, women self selected into groups. Imbalance of treatment demographics related to lack of randomization |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Januse k et al. (2019) | Mindfulness will have positive effects on the immunosuppressio n that occurs as a result of the natural stress response | How does MBSR benefit the psychologic al, behavioral, and immunologi cal function in pts with early stage breast cancer | Randomize d longitudinal trial with active control | Women with early stage breast cancer<br><br>Sample = 164 women | Quality of Life Cancer Version III, Mindful Attention Awareness Scale, PBMC, NKCA, Cortisol | A significant relationship exists between MBSRs ability to promote reduction in sleep disturbance s and fatigue, thereby promoting NKCA restoration. | participants in this study did not maintain a consistent log of their practice times, indicating a potential limitation of the study results as findings in the MBSR group may or may not have been affected by differences in individual at home practices. The demographic of women involved in this study were mainly white, middle-class, and married, limiting the ability to generalize the results of this study to non-white individuals of differing socio-economic status. |
| Kenne Sarenla m et al. (2013) | Psychosocial distress results in biological implications | What is the efficacy of MBSR intervention on the well-being and immune response in women with breast cancer? | Three-arme d randomized control design | Sample: 166 women with early-stage breast cancer after completion of chemo. With or without radiation therapy | HAD Scale, MSAS Scale, PMBC FFMQ | improvemen ts in NKCA and T-Cell concentratio n observed in this study were related to improvemen ts in perceptions of individual growth and an improvemen t in perceptions of meaning established through | discrepancies in randomization of cancer staging among the groups as well as the failure of the study to exclude women with mood disorders from participation |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | participation in MBSR. | |
| Lengacher et al. (2012) | Mindfulness practices positively influence psychological and physical symptoms | What are the acute effects of MBSR on salivary cortisol and salivary IL-6 as measures of acute stress. | Quasi-experimental pre-post test design | Sample: women / men with stage 3 or 4 breast, colon, lung or prostate cancer who completed surgery or undergoing RT or CT<br><br>26 Total | Stress, Depression, Anxiety, MSAS, QOL, Cortisol, IL-6 | a significant change in salivary cortisol of participants was observed at week one and three but not at week six. It is suggested that a significant decrease at week six was not found due to cortisol levels being already reduced by the time assessments were to be conducted at week six. A lower IL-6 concentration overall was noted in patients by week six, this result was lower than baseline. | No control, small sample, non-compliance with prescribed time for home practice, no follow-up |
| Lengacher et al. (2014) | Mindfulness practices have a positive effect on DNA replication and reinforces mutation regulation | What is the effect of MBSR(BC) on telomerase length and telomerase activity? | Randomized wait-listed controlled study | 134 women stage 0-3 breast cancer, who had undergone lumpectomy, or completed RT or CT | TL and TA analysis | After twelve weeks, telomerase activity in women assigned to the MBSR group increased steadily over time, a significant finding | Acute effects only evaluated after 12 weeks, did not control for the effect of group dynamics on study outcomes |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | despite efforts to control for baseline TA among these individuals. There was no indication that MBSR had a significant effect on TL of the participants | |

**Appendix C- Results**

**Statement 1**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | | 8 | 11.6 | 11.6 | 11.6 |
| | 0 | 1 | 1.4 | 1.4 | 13.0 |
| | 1 | 3 | 4.3 | 4.3 | 17.4 |
| | 2 | 4 | 5.8 | 5.8 | 23.2 |
| | 3 | 5 | 7.2 | 7.2 | 30.4 |
| | 4 | 7 | 10.1 | 10.1 | 40.6 |
| | 5 | 11 | 15.9 | 15.9 | 56.5 |
| | 6 | 11 | 15.9 | 15.9 | 72.5 |
| | 7 | 18 | 26.1 | 26.1 | 98.6 |
| | Please rate your level of agreement with each statement on a scale from 0 - 7. - I am familiar with the practice of mindfulness and mediation | 1 | 1.4 | 1.4 | 100.0 |
| | Total | 69 | 100.0 | 100.0 | |

**Statement 2**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | | 8 | 11.6 | 11.6 | 11.6 |
| | 0 | 3 | 4.3 | 4.3 | 15.9 |
| | 1 | 5 | 7.2 | 7.2 | 23.2 |
| | 2 | 4 | 5.8 | 5.8 | 29.0 |
| | 3 | 7 | 10.1 | 10.1 | 39.1 |
| | 4 | 14 | 20.3 | 20.3 | 59.4 |
| | 5 | 11 | 15.9 | 15.9 | 75.4 |
| | 6 | 6 | 8.7 | 8.7 | 84.1 |
| | 7 | 10 | 14.5 | 14.5 | 98.6 |
| | Please rate your level of agreement with each statement on a scale from 0 - 7. - I am knowledgeable of how to instruct patients in mindfulness practices | 1 | 1.4 | 1.4 | 100.0 |
| | Total | 69 | 100.0 | 100.0 | |

**Statement 3**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | | 9 | 13.0 | 13.0 | 13.0 |
| | 0 | 5 | 7.2 | 7.2 | 20.3 |
| | 1 | 5 | 7.2 | 7.2 | 27.5 |
| | 2 | 5 | 7.2 | 7.2 | 34.8 |
| | 3 | 8 | 11.6 | 11.6 | 46.4 |
| | 4 | 8 | 11.6 | 11.6 | 58.0 |
| | 5 | 11 | 15.9 | 15.9 | 73.9 |
| | 6 | 8 | 11.6 | 11.6 | 85.5 |
| | 7 | 9 | 13.0 | 13.0 | 98.6 |
| | Please rate your level of agreement with each statement on a scale from 0 - 7. - I regularly instruct my patients in practices involving mindfulness | 1 | 1.4 | 1.4 | 100.0 |
| | Total | 69 | 100.0 | 100.0 | |

**Statement 4**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | | 8 | 11.6 | 11.6 | 11.6 |
| | 0 | 1 | 1.4 | 1.4 | 13.0 |
| | 3 | 2 | 2.9 | 2.9 | 15.9 |
| | 4 | 8 | 11.6 | 11.6 | 27.5 |
| | 5 | 6 | 8.7 | 8.7 | 36.2 |
| | 6 | 10 | 14.5 | 14.5 | 50.7 |
| | 7 | 33 | 47.8 | 47.8 | 98.6 |
| | Please rate your level of agreement with each statement on a scale from 0 - 7. - I believe that mindfulness practices offer beneficial physiological benefits | 1 | 1.4 | 1.4 | 100.0 |
| | Total | 69 | 100.0 | 100.0 | |

**Statement 5**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | | 9 | 13.0 | 13.0 | 13.0 |
| | 0 | 1 | 1.4 | 1.4 | 14.5 |
| | 3 | 1 | 1.4 | 1.4 | 15.9 |
| | 4 | 8 | 11.6 | 11.6 | 27.5 |
| | 5 | 6 | 8.7 | 8.7 | 36.2 |
| | 6 | 8 | 11.6 | 11.6 | 47.8 |
| | 7 | 35 | 50.7 | 50.7 | 98.6 |
| | I believe that mindfulness practices offer beneficial psychological benefits | 1 | 1.4 | 1.4 | 100.0 |
| | Total | 69 | 100.0 | 100.0 | |

**Statement 6**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | | 8 | 11.6 | 11.6 | 11.6 |
| | 0 | 4 | 5.8 | 5.8 | 17.4 |
| | 1 | 3 | 4.3 | 4.3 | 21.7 |
| | 2 | 7 | 10.1 | 10.1 | 31.9 |
| | 3 | 5 | 7.2 | 7.2 | 39.1 |
| | 4 | 14 | 20.3 | 20.3 | 59.4 |
| | 5 | 13 | 18.8 | 18.8 | 78.3 |
| | 6 | 4 | 5.8 | 5.8 | 84.1 |
| | 7 | 10 | 14.5 | 14.5 | 98.6 |
| | I am familiar with Mindfulness-based stress reduction therapy (MBSR) | 1 | 1.4 | 1.4 | 100.0 |
| | Total | 69 | 100.0 | 100.0 | |

**Statement 7**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | | 10 | 14.5 | 14.5 | 14.5 |
| | 0 | 1 | 1.4 | 1.4 | 15.9 |
| | 3 | 1 | 1.4 | 1.4 | 17.4 |
| | 4 | 3 | 4.3 | 4.3 | 21.7 |
| | 5 | 11 | 15.9 | 15.9 | 37.7 |
| | 6 | 7 | 10.1 | 10.1 | 47.8 |
| | 7 | 35 | 50.7 | 50.7 | 98.6 |
| | I am open to learning about MBSR | 1 | 1.4 | 1.4 | 100.0 |
| | Total | 69 | 100.0 | 100.0 | |

**Statement 8**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | | 8 | 11.6 | 11.6 | 11.6 |
| | 0 | 2 | 2.9 | 2.9 | 14.5 |
| | 3 | 3 | 4.3 | 4.3 | 18.8 |
| | 4 | 6 | 8.7 | 8.7 | 27.5 |
| | 5 | 13 | 18.8 | 18.8 | 46.4 |
| | 6 | 11 | 15.9 | 15.9 | 62.3 |
| | 7 | 25 | 36.2 | 36.2 | 98.6 |
| | I am open to suggesting MBSR as a complementary therapy to my patients | 1 | 1.4 | 1.4 | 100.0 |

| | | | | |
|---|---|---|---|---|
| | to promote immune recovery | | | |
| | Total | 69 | 100.0 | 100.0 |

**Statement 9**

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Valid | 9 | 13.0 | 13.0 | 13.0 |
| 0 | 2 | 2.9 | 2.9 | 15.9 |
| 3 | 1 | 1.4 | 1.4 | 17.4 |
| 4 | 7 | 10.1 | 10.1 | 27.5 |
| 5 | 8 | 11.6 | 11.6 | 39.1 |
| 6 | 13 | 18.8 | 18.8 | 58.0 |
| 7 | 28 | 40.6 | 40.6 | 98.6 |
| I am open to suggesting MBSR as a therapy to promote psychosocial health and wellbeing | 1 | 1.4 | 1.4 | 100.0 |
| Total | 69 | 100.0 | 100.0 | |

**Statement 10**

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Valid | 8 | 11.6 | 11.6 | 11.6 |
| 0 | 1 | 1.4 | 1.4 | 13.0 |
| 2 | 1 | 1.4 | 1.4 | 14.5 |
| 4 | 7 | 10.1 | 10.1 | 24.6 |
| 5 | 7 | 10.1 | 10.1 | 34.8 |
| 6 | 9 | 13.0 | 13.0 | 47.8 |
| 7 | 35 | 50.7 | 50.7 | 98.6 |
| I believe there should be increased availability of education regarding MBSR enrollment and referral | 1 | 1.4 | 1.4 | 100.0 |
| Total | 69 | 100.0 | 100.0 | |